

THE ADVANTAGES
OF
ETHER AND CHLOROFORM
IN
OPERATIVE SURGERY.

AN ADDRESS
DELIVERED TO
THE HUNTERIAN SOCIETY,

On the 9th of FEBRUARY, 1848.

BY
T. B. CURLING,
LECTURER ON SURGERY AT THE LONDON HOSPITAL, ETC.

LONDON:
S. HIGHLEY, 32, FLEET STREET.

1848.

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TO THE
MEMBERS
OF THE
HUNTERIAN SOCIETY OF LONDON,

This Address,

DELIVERED AT THEIR TWENTY-NINTH ANNIVERSARY,

IS RESPECTFULLY INSCRIBED.

37, NEW BROAD STREET,
February 14, 1848.



ADDRESS.

MR. PRESIDENT AND GENTLEMEN,—

I have the honour to appear before you this day to deliver the Address customary at our Annual Commemoration. And in my anxiety to select a topic worthy of engaging your attention, I have been led to refer back to the views of its originator. Sir WILLIAM BLIZARD, in the first Oration ever delivered to this Association, stated its object to be “the honour of the Hunterian Society by the impression of Truths upon minds ever prompt to receive them for the advancement of the Healing Art.” It will be my endeavour steadily to bear in mind this injunction; and I know not in what way I can pay greater honour to this Society, and better promote the object of the respected Founder of this discourse, than by attempting to ascertain the value of a recent discovery—a discovery which has largely occupied the attention of medical men during the past year, and one, in which the public equally with the profession, has naturally manifested the most lively interest.

The topic, then, which I have selected for this evening’s Address, is “Some of the evils attending the Operations of Surgery, and the advantages of Anæsthetic Agents in counteracting them.” This is, in truth, a subject which has been frequently under discussion at our ordinary meetings, and which has occupied a considerable space in the medical journals, so that many of the observations

I am about to offer must necessarily be trite and familiar. Still, the question of Anæsthetic Remedies is of so much importance, and of such great and universal interest, that I conceive no apology required for inviting your attention to the results of a careful and, I trust, impartial consideration of the advantages of this remarkable discovery as applied to Operative Surgery.

It is well known to you that the vapour of Ether was first exhibited for the prevention of pain in operations in the United States of America. There are several claimants for the honour of this discovery; but the chief merit appears to be due to Dr. MORTON, a Dentist practising in Boston. This gentleman, whilst engaged in experiments made for the purpose of obviating pain in surgical operations, communicated the object of his inquiries to Dr. JACKSON, a Lecturer on Chemistry, who suggested a trial of sulphuric ether. Dr. MORTON, availing himself of this hint, experimented with ether first upon himself, and then upon others, with perfect success in regard to the object he had so long had in view; and having constructed a suitable apparatus for administering the vapour, he communicated the results of his inquiries to Dr. WARREN, Surgeon of the Massachusetts General Hospital, who, after satisfying himself of its efficacy, introduced the practice into the Hospital, and performed the first important operation under its influence.—Gentlemen, I need not tell you, who participated in the sentiment, how gladly the profession in Britain hailed the announcement from America of the discovery of an effectual mode of dissipating pain, nor of the eagerness which was displayed to put so promising a remedy to the test. Etherization was resorted to for

the first time in this country, by the late Mr. LISTON in December 1846, in the amputation of a thigh at the University College Hospital.—And here I must pause one moment, to pay a tribute to the memory of this distinguished Surgeon. His remarkable skill as an operator, and his zeal, and promptitude in testing the merits of anæsthetic agents especially, claim some notice on this occasion. A few weeks only before his death I witnessed two severe operations performed by him on persons under the influence of ether, and with his accustomed dexterity and tact. One was particularly protracted, and I well remember his exclamation to the pupils, that it was fortunate for the patient there was such a thing as ether. Gentlemen, melancholy indeed is the fate of one, apparently so full of health, and power, and promise, suddenly cut off in the meridian of his fame, when, after surmounting the difficulties of his career, he was reaping the harvest of his exertions and skill:—“*O fallacem hominum spem, fragilemque fortunam, et inanes nostras contentiones!*” *—During the past year ether has been employed at all our large hospitals, and I may say, by every operating surgeon in Great Britain, and likewise very generally by the surgeons of France, Germany, and Italy. In the month of November last Professor SIMPSON, of Edinburgh, announced to the profession a new anæsthetic agent, called Chloroform, as a substitute for ether, over which it was represented to possess some important advantages. It appears, that some months previously, this compound had been experimented upon, and tried by others, but Dr. SIMPSON is undoubtedly entitled to the credit of having established its claims as a valuable

* Cic. de Oratore, lib. iii, c. 2.

remedy for pain. Many thousand operations have been performed on patients under the influence of ether and chloroform, and the extent of our experience is such as to enable us to form something like a just appreciation of the value of these agents in counteracting the greatest drawback on the duties of an operating surgeon—the necessity for the infliction of pain. In addition to the opportunities for observation afforded at the London Hospital, I have witnessed numerous painless operations performed at the other hospitals in the metropolis, and endeavoured, moreover, to ascertain the views of those who have given these remedies the fairest trial before venturing to offer any opinion respecting them, ever bearing in mind the ancient caution “to be sober-minded and not credulous.”—Νᾶφε καὶ μέμνασ ἀπιστεῖν.*

But let me first consider the necessity that exists for the use of anæsthetic remedies in operative surgery. “*Tactus autem toto corpore æquabiliter fusus est, ut omnes ictus, omnesque nimios et frigoris et caloris appulsus, sentire possimus.*”† Such is the description by Cicero of that beautiful provision for our safety afforded by the sensibility of the different tissues and organs of the body, the protecting influence of which was so fully and so truly appreciated by that ancient writer. But independently of the benefit derived from this susceptibility in guarding the frame from injury, I know of no purpose served, and of no advantage gained, by the infliction of pain. The grave operations of surgery are very generally regarded with dread; and although, when the inevitable necessity arises, most persons of ordinary courage can summon up resolution to encounter the knife, the pain caused by it is

* Epicharmus.

† Cic. de Nat. Deor. lib. ii, 56.

an evil, which even the bravest spirits would most gladly avoid.

The degree in which persons are liable to pain is very various ; and this is so remarkable, that a wound which causes actual torture to some, may produce a sensation quite tolerable to others. Fortitude displayed under suffering is consequently not always so great as it appears, and its amount is often incorrectly estimated by observers. The more remarkable instances in which acute and prolonged tortures have been sustained without the slightest exhibition of suffering may be eminent examples of fortitude ; but I am convinced that in some of these instances there has been an actual incapacity of feeling pain, which has come greatly in aid of the moral courage exhibited in such cases. Military history furnishes examples of men who have not only displayed bravery in the field, but have afterwards borne the pain of a severe operation without flinching ; whilst others who have shown undaunted courage in face of the enemy, have timidly recoiled from the surgeon's knife, and been unable to repress the customary expressions of suffering under its use. This may be accounted for by differences in the susceptibility of pain, and in natural powers of endurance, rather than in moral strength and courage. The experience of every operating surgeon will enable him to recall to mind illustrations of what I have just stated—cases, on the one hand, of persons who seemed almost callous to the pain inflicted by the knife ; —who, for instance, whilst undergoing an amputation have coolly watched all the steps of the proceeding : and, on the other hand, of persons apparently not deficient in courage, who under an operation could only

suppress their groans by the strongest effort, or did not fail to give audible evidence of the intensity of their sufferings. And the proof that this difference does not depend on voluntary efforts, is drawn from the fact of its manifestation at an age, when strong motives for the exhibition of fortitude can scarcely be said to operate. In June 1844, I amputated the thigh of a delicate girl only eight years of age, on account of chronic disease of the knee-joint. The little patient was most anxious to have her limb removed, and was quite cross because I found it convenient to postpone the operation for a few days beyond the time appointed. She bore all the steps of the operation by double flap, with the greatest composure, and evinced no signs of pain, when, after securing the arteries, I excised a projecting portion of the posterior crural nerve. This enviable state of constitution, in which the body is in a degree proof against suffering, is attended with the further advantage, that after severe accidents and operations, there is little if any evidence of shock, and very slight subsequent reaction. This was well exemplified in the case I have just narrated. The little girl passed the night in quiet sleep, just as if nothing had happened, and was able next day to take her usual diet of meat and porter. There were no symptoms of fever, and not a dose of medicine was given, until after the stump had healed, at the end of three weeks, when she was ordered some quinine.—The following, is a far more extraordinary case of absence of shock, with comparative immunity from pain. A boy nine years of age, approaching too near a steam-engine, his pinafore was caught by a wheel, and he was dragged amongst the machinery. On being released, he was immediately car-

ried to the London Hospital, when I found that he had sustained the following injuries:—a compound fracture of the right humerus, with nearly three inches of bone projecting at the wound; a compound fracture of the left femur at its lower part, with much displacement, the wound communicating with the knee-joint; a comminuted fracture of the right thigh; a fracture of the right tibia, and fibula; and the right foot torn off about the junction of the tarsal and metatarsal bones, the laceration extending above the ankle. Now, notwithstanding these numerous, severe, and complicated injuries, there was no evidence of shock, scarcely any depression; the pulse was good, and the little patient in a condition to bear an operation. After sawing off the projecting portion of the humerus, and placing the limb in splints, and after setting also the compound fracture of the left femur, I amputated the right leg high up and above the fracture, the artery being compressed at the groin, as the broken femur on that side also, prevented the use of a tourniquet. The operation was borne without expression of suffering; very little reaction or fever ensued; the stump healed; the fractured humerus united, and the wound closed. But the occasional shifting of the limb, in dressing the stump, prevented the right femur from uniting, and caused the formation of an abscess; and this, coupled with the supuration from the other thigh, where the injury communicated with the knee-joint, ultimately exhausted the boy's powers, brought on hectic, and caused death, after a hard struggle, and not until upwards of two months after the receipt of the injuries.

But not only do we occasionally meet with instances of a natural insusceptibility to pain, but what is more

remarkable, cases sometimes occur in which a kind of morbid pleasure is taken, I cannot say in the infliction of pain, but in undergoing those mutilations which usually give rise to it. It is true, some of these are cases of monomaniacs, but they nevertheless furnish curious examples of a callous indifference to a common cause of dread and suffering. Sir WILLIAM BLIZARD was in the habit of mentioning in his clinical lectures, the case of a woman, who came into the London Hospital, in consequence of some supposed disease of the breast. The part was removed by Mr. GRINDALL, and the operation borne with the greatest fortitude. On examination, the gland was discovered to be full of pins and needles. She afterwards became an inmate of one of the Borough hospitals, and submitted to amputation of the other breast, which was found to be affected in a similar manner.—The following case came under my own notice, a few years ago. A woman, 38 years of age, complained of suffering so much from intractable sores, and extensive sinuses, with induration in the left breast, that she anxiously begged to have the part removed. The operation was performed, and borne by the patient without wincing. About a month after the wound had healed, the other breast became diseased in the same way. As before, the sinuses were repeatedly laid open, and various measures taken to obtain the healing of the sores, but without success, and the woman represented her sufferings to be so severe that she urged the removal of this breast also. The second operation was submitted to, with the same indifference that was displayed in the first. After a ready recovery from this, fresh sores formed in other parts, and new complaints arose, and it was ultimately

proved, that she was a confirmed impostor ; all her disorders having been either feigned, or of her own creation.* —A distinguished surgeon mentioned to me the singular case of a monomaniac, who applied to a surgeon of eminence many years ago, to remove a bougie from his bladder. The patient represented, that one night he fell asleep with a bougie in the urethra, and on awaking the instrument was nowhere to be found, and had, he said, passed into the bladder. He succeeded in convincing the surgeon that the bougie was lodged there, and this gentleman, who was passing into years, was rash enough to perform the high operation above the pubis, for its removal. When the bladder was opened, nothing solid was found within it. The patient fortunately recovered from this dangerous operation, and some time afterwards called on my informant, to say, that the bougie was coiled up in a cyst, at the side of the bladder, and thus had escaped the search made for it ; and this madman would readily have submitted to a second operation.—I might easily add to the cases just related, others of a similar character ; such as instances of women who have submitted to repeated operations for hysterical neuralgia, especially two remarkable cases, in which, after lesser amputations, disarticulation was performed, in one at the shoulder-joint, and in the other at the hip-joint ; but those mentioned are sufficient to show the deadened and perverted sensibilities which sometimes exist, and the readiness with which recovery takes place after the infliction of injuries under such circumstances.

* The case of a woman who submitted to amputation of both breasts for feigned disease, related by Dr. Lentin in a German work, is quoted in the *Cyclopædia of Medicine*, vol. ii, p. 129.

In treating of pain, I have hitherto dwelt chiefly on the differences which naturally exist, in the susceptibility of individuals to painful impressions, independently of any voluntary control. But the susceptibility differs further, according as the mind co-operates, and as the feelings are tutored for the perception or tolerance of pain. The state of the nerves of sensation, like that of the feelings, may indeed be strengthened and fortified against pain by mental influence,—by that healthy training of the mind which renders the emotions subservient to the powers of the understanding; and it is to the exercise of this acquired power of suffering that the term *fortitude*, in its highest sense, is most fitly applicable. On the other hand, the sensibility of the skin, like the finer sensibilities of the mind, may be exalted and increased by cultivation—may be so cherished, that ordinary impressions become intolerable; and this may be carried so far as to constitute a state of morbid sensibility, the mind, of course, co-operating in the unhealthy excitement. The mind has, indeed, a remarkable power of rousing or soliciting sensations in the nerves of common sensibility; just as the thought of something nauseous excites sometimes the sensation of nausea, so the idea of pain gives rise to the actual sensation of pain in a part predisposed or liable to it.* Of the latter, we have a good illustration in cases of morbid sensibility of the breast in persons who, apprehensive of cancer, so anxiously watch every sensation in the part as to magnify their feelings into pain, and, unconsciously, to produce suffering. And it is in consequence of the influence of the mind, both in exaggerating and creating pain, that so much benefit is

* Müller.

derived in the removal or suspension of suffering, from diverting the attention, and engaging the thoughts on subjects of interest and pleasure.

I cannot quit the subject of the influence of the mind on the feelings, without contrasting the suffering state of the hero and of the martyr, with that of persons undergoing surgical operations. The former, whilst submitting to all the tortures that the malice and cruelty of their enemies can inflict, in the maintenance of the liberties of their country, or in the cause of religion, find a sustaining force in the high excitement,—the ecstatic and enthusiastic rapture,—the fervid and all-absorbing thoughts of a future,—emotions which powerfully help to support the frame under its sufferings, and doubtless to moderate their intensity. But how different with the objects of our sympathy and care ! They may not be denied the consoling influence of religion ; but, oppressed and overwhelmed by some terrible casualty, or harassed and worn out by some tormenting local disease, and counting the hours of their suffering, which instead of inuring them to affliction, has given variety to pain, and heightened their susceptibility—they fully need, in the hour of trial, all the solace, and all the alleviation, that our humanity can suggest, and our art afford.

But the infliction of pain is not the only suffering produced by the surgeon in the exercise of the most unpleasant duty of his art. The suffering of the mind arising from the dread of an operation often far exceeds that of the body endured in its performance, so that patients who have entertained the greatest horror of the knife, and have with difficulty screwed up their courage to submit to it, have afterwards been surprised at the small

amount of pain they had undergone, in comparison with what their imagination led them to anticipate. In some ‘Observations on Wounds,’ published by Sir W. BLIZARD, many years ago, he remarks, “There is sometimes a state of dreadful apprehension concerning operations, even in persons of undoubted courage. An occurrence some years since, at the London Hospital, will express this in a striking manner, and may convey some instruction. A foreigner was to have his leg amputated, on account of a disease in it, through which he was sinking. He was so reduced, that it was determined to perform the operation on his bed. At the moment of proceeding to the incision, he suddenly raised himself, fainted, and fell backwards. He thus continued some minutes, with a pulse barely perceptible. He then recovered a little, again started up, asked, ‘Is my leg off?’ and, upon being told it was not, fainted again. It was judged that he would inevitably die without amputation ; that he would probably die from repeated fainting ; that the operation, performed with due care as to loss of blood, would tend to rouse, instead of weakening, the action of the heart and vessels ; and that, therefore, it ought to be performed. It was done with as much expedition as possible. The operation was entirely finished when he again raised himself, and put the question as before. Being assured that his leg was removed, he instantly became cheerful, and fainted no more. He left the hospital perfectly well ; and always declared that he had not the least painful sensation from, or consciousness of, the operation.”—In the year 1833, I saw, with Sir W. BLIZARD, a lady between 40 and 50 years of age, who had a large open fungoid sore of the breast, consequent on the ulceration of a sero-cystic

tumour. The removal of the breast was proposed, and urged, as the only means of saving life ; but it was obstinately rejected, the patient entertaining the greatest dread of undergoing any operation. A few days afterwards, however, the husband called on me to say that she had consented to submit to it. When we visited her to perform the operation, we found her, apparently almost dead from excessive apprehension. She was faint, tremulous, and pallid, and her pulse was hardly perceptible. After taking some wine and ammonia, she revived a little, but soon relapsed into a similar state of collapse, in which she had scarcely power to exclaim, “ Why do you deceive me ? Why don’t you go on ? ” After waiting nearly an hour, and finding her a little restored, Sir W. BLIZARD thought it desirable not to delay any longer, being of opinion that the operation would act as a stimulant, and that her depressed condition being the result of extreme dread, was not likely to be improved till the breast was removed. She was in the recumbent position, so, without disturbing her, I excised the diseased breast as quickly as possible. After the first incision she revived a little, but soon became slightly convulsed. Very little blood was lost, and when the operation was over, she expressed herself as feeling far more comfortable, and her pulse was decidedly improved in power. I have never performed an operation under circumstances so alarming as existed in this case. The state of death-like collapse, evidently the result of extreme dread, would certainly have deterred me from proceeding, had I not been encouraged by more experienced advice. The operation proved, as had been anticipated, a stimulus, and served to rouse the patient from the deep prostration into which

she had fallen.—The state of system consequent upon great dread, or making up the mind to the endurance of a painful operation, is related in some few instances to have had a fatal termination. A case of this kind occurred to that eminent and cautious surgeon Mr. CLINE. A patient whose breast he had amputated, expired within an hour afterwards, without any loss of blood, and having had no previous indisposition, only a prodigious reluctance to the performance of the operation.*—Our respected Honorary Member, Mr. TRAVERS, mentions the case of a man who was the subject of strangulated hernia, and expired suddenly during the steps preliminary to the operation, though the circumstances were, in other respects, such as to afford the fairest prospect of relief.†—Some years ago a man died at the London Hospital whilst undergoing an operation for femoral aneurism. After the artery had been exposed and the ligature applied, but not tightened, it was discovered that there was no pulsation in the tumour, and that the patient was dead.

Fear is the strongest, as well as the most painful, of all the passions,‡ and when excited in a high degree, as we have just shown, it powerfully depresses the vital powers, enfeebles the whole frame, and even produces death. The conduct and exclamations, previous to the operations, of the man whose leg was amputated by Sir W. BLIZARD, and of the lady whose breast I removed, clearly expressed the mental agony which they suffered; and in this respect, they offer a striking contrast to the three cases last related, for these persons, in all proba-

* Lectures on Surgery. London Medical Gazette, vol. xxiii, p. 1.

† Inquiry concerning Constitutional Irritation, p. 17. ‡ Cogan.

bility, endured the more by striving to repress the internal struggles of the mind. There cannot be a doubt, that the intensity and hurtful effects of pain are liable to be much increased by efforts made to restrain the expression of it; and that cries and groans, though denoting pain, really serve to alleviate suffering, and to counteract the shock produced by it—an observation to the justice of which, as exemplified in childbirth, all accoucheurs can bear testimony. This observation, however, applies only to acute anguish, particularly when protracted; for the effort of the mind to suffer well, which constitutes fortitude, really diminishes pain of a less severe character, and thus affords some recompense for the exercise of this noble virtue.

A distinction must be drawn between the fear of the pain and the fear of the consequences of an operation, the latter being by far the more important. In the first case, where the mind is absorbed solely with the dread of pain, the patient experiences at the conclusion of the operation, a sense of joy at relief from a great impending evil—an exhilaration of spirits at the worst being over, and receives, with confidence and delight, the assurance of the surgeon of his speedy recovery. But not so the man whose spirits are depressed, less by the fear of pain, than by the dreaded anticipation of soon losing his life. To him

“Hope is nothing but a false delay,
The sick man’s lightning half an hour ere death.”

BYRON.

The fear of death has been well described as a deadly poison, paralysing the vital power.* Sometimes this gloomy foreboding is not without foundation. Organic

* Hufeland.

disease, as yet masked and undetected, has extended its fatal influence to the nervous system, and produced dejection and despondency. Certainly, no surgeon would, if he could avoid it, perform an operation on a person strongly prepossessed with the idea that he should not recover from it. The most striking instance of the fatal effects of this distressed state of mind that I am acquainted with, is a case mentioned by Mr. CLINE. A gentleman was supposed to have the stone, and was sounded for it. On being informed that there was a calculus, he was exceedingly struck, and said he should never survive. In about five hours afterwards, though there had been no previous indisposition, he expired.* Such cases are extremely rare; but we often meet with persons who receive the announcement of the necessity for undergoing a serious operation with strong emotion and alarm,—whose fears lead them to magnify the risks, and to suspect a concealment of the worst—men

“who at the sound of death
 See ghastly shapes of terror conjured up,
 And black before *them* ; naught but deathbed groans
 And fearful prayers, and plunging from the brink
 Of light and being, down the gloomy air,
 An unknown depth.”

AKENSIDE.

Such, then, are some of the evils and dangers attending the important operations of surgery. I may now inquire whether, and how far, they can be safely met and obviated by anæsthetic agents. I shall not occupy your time by discussing the proper mode of administering these remedies, or by describing their physiological effects on the human body, as I desire to limit my observations

* Lib. cit. p. 1.

chiefly to their usefulness in the practice of operative surgery. It has long ceased to be a question whether ether and chloroform possess the power of preventing and annulling pain. Countless operations, many of them productive, under other circumstances, of pain of the most intense character, have been performed on persons under the influence of these agents, without their experiencing the slightest suffering. In reference to the comparative merits of the two remedies, it will be sufficient to remark that whilst ether, when skilfully administered, can accomplish all that may be effected by chloroform, the latter has many important advantages; being less pungent and more agreeable, possessing greater power, and consequently operating more quickly and with greater certainty, and with a much smaller consumption of fluid, and also being easier and simpler of application. For these various reasons, chloroform has been very generally substituted for ether. But there are certain cases in which I am disposed to think that a preference is to be given to ether. Chloroform has a greater tendency to produce involuntary muscular contraction, and exerts also a more direct and a more powerful influence on the heart than ether. In those cases, therefore, in which we desire chiefly to obtain muscular relaxation, and in persons whose powers are much depressed, it may be advisable to employ ether. Ether is, perhaps, better suited also for those cases in which we desire to prolong the insensibility to pain, as its influence is less transient than chloroform, and more readily rendered persistent. In a recent private communication from Dr. SIGMUND, of Vienna, I learn that a mixture of the two has been employed by WEIGERT, a dentist in that city, and

this may probably be found to combine the advantages of both. In some trials which Dr. PARKER and myself have made with them, mixed in different proportions, they seem likely in some cases to answer well, especially in children. In the instance of an infant only a year old, who had a large nævus on the forehead, which I thought right to ligature, their influence was successfully maintained for half an hour with the happiest effect.

It is quite superfluous to remark to such an assembly as this, that in all great operations, the abatement of physical pain has always been a primary object of the surgeon; and for this purpose his skill and ingenuity have been taxed to devise methods of proceeding which can be quickly executed, and with the smallest possible division or injury of sensitive parts. By a brilliant operation, has always been understood one safely and efficiently, but rapidly, performed, and at the least expense of suffering to the patient. It cannot, therefore, be doubted for one moment that the means of effectually securing this important object of the surgeon, immunity from pain, provided that immunity can be safely obtained, is an invaluable gain to humanity. I have, it is true, brought forward certain cases in which persons have exhibited so great an incapacity for, or tolerance of, pain, that they would scarcely seem to need the use of any remedies to obviate suffering. But it must be borne in mind that these are rare and exceptional cases; and a main object in calling attention to them was to point out the remarkable success of severe operations performed on such persons, and the almost entire absence of shock and subsequent reaction, as justifying the belief that these important advantages are in a great measure

attainable, in ordinary cases, by the employment of anæsthetic agents. That the immediate effects are beneficial is shown by the fact, that since their use the common practice of giving opiates at the conclusion of operations, to allay pain and irritation, and to lessen the influence of shock, has been almost entirely abandoned. I have carefully watched the progress of cases after operations of various kinds, performed on persons in a state of anæsthesia, and I can with confidence declare that, so far as my present experience has reached, the constitutional symptoms have been milder, and the cases have proceeded more satisfactorily, than after operations in which no means had been taken to prevent pain. Several of my surgical friends can fully confirm this statement; and I think it but fair and reasonable to attribute these favorable results to the saving of the shock and distress hitherto caused by severe and painful operations. The ill consequences arising from exhaustion of the vital powers in such operations, when long protracted, apart from the effects of loss of blood, are so great and serious, that the possession of remedies, by which these evils can be almost wholly avoided, cannot be too highly prized.

I have alluded particularly to one element of skill in operating, viz., rapidity. Now that the proceeding can be rendered painless, expedition will be of less importance, a true gain to the operator, since it will give him the opportunity of acting with greater deliberation and composure; and hence an advantage to the patient, also, whose interests cannot be otherwise than perilled by any precipitancy arising from a very natural anxiety to conclude what is known to be productive of suffering and shock. In many operations it is most desirable that the patient should remain perfectly at rest, in order that the

knife may be used with the utmost nicety. Every operator has at times experienced serious inconvenience in painful and tedious operations, from the difficulty of controlling the patient's writhings, and of keeping him quiet during the performance of a delicate and careful dissection. In some instances the operation has been abandoned, owing to the impatience and want of self-control of the sufferer. These evils may be effectually remedied by anæsthetic agents. But let it not be imagined that these remedies will place the rude and inexperienced operator on the same level with the adroit and able surgeon. This can never be the case, whilst so much depends on the judgment and skill by which the steps of an operation are planned; on sagacity and decision, in seizing the critical moment for performing it; on the promptitude and resolution by which emergencies are met as they arise; and on fertility and tact in expedients: nor so long as the success of numerous delicate operations is greatly influenced by the gentleness and care with which parts are handled, avoided, or left undisturbed.

There is a class of persons, for whose sufferings our sympathies are always deeply roused, and who undoubtedly feel acutely in operations. I allude to children, too young to draw any consolation from the anticipation of the ultimate benefit to be derived from the endurance of a temporary evil. It is a very gratifying circumstance that anæsthetic remedies act kindly upon them. They become rapidly affected, and the influence as quickly passes off. These agents have been given with success and safety to many young children, and even at so early an age as four weeks after birth.

I have dwelt somewhat at length on the distress of mind arising from the dread of an operation, which I

have remarked is often far worse than the pain endured in its performance ; and I have shown that the depressing effects of this state of mind greatly aggravate the dangers of the case. Now, in those instances in which the suffering of the mind is caused by the fear of the pain, and not of the consequences of the operation, the evil can be almost entirely removed by a fair representation of the powers of anæsthetic agents—by producing conviction on the mind of the patient that the operation can be completed without his experiencing the slightest pain. Henceforth no such depressing dread, as I have shown sometimes to exist, can occur, except in persons of most sceptic minds. And that this harassing apprehension is a common and real, not a rare or imaginary evil, is proved by the solicitude so generally exhibited by patients to take these remedies—a solicitude sometimes so great, that every operating surgeon must have met with persons, who have only been induced to submit to the ordeal of the knife, on the express condition, that they should be freed from its pain. Patients, too, and there are many such, disposed to conceal the existence of a disease, which they know full well can only be remedied by the knife, learning that this may be employed without pain, will seek aid from a source from which they before recoiled with unconquerable dread, and no longer resign themselves to the slow tortures of disease in preference to undergoing a surgical operation. Then, again, there are cases of common occurrence in practice, such as cancer of the breast somewhat advanced, in which the prospect of permanent benefit from an operation appears so unpromising, that the surgeon has hesitated to recommend his patient to submit to so severe a measure as excision of the affected part. But the knowledge that the diseased

breast may be removed without pain, as well as with very little risk to life,* encourages the operator to afford a chance which he would otherwise have questioned the propriety of offering.

It remains, however, to be determined, whether ether and chloroform are safe remedies—whether there are not evils resulting from their inhalation, greater than the benefits derived from their staying the pain and counter-acting the shock of the operation. Those who have conversed with surgeons on the subject, cannot fail to have noticed amongst some of them a want of confidence in these remedies. Now, it is very important to ascertain if this want of confidence really be well founded. The objections entertained to the use of anæsthetic agents in surgical operations are chiefly the following :—

1. Danger and inconvenience in their administration.
2. Hurtful effects produced by them on the constitution, increasing the fatality of operations.

Other objections have been offered ; but as some of them are altogether chimerical, and others, such as darkening and fluidity of the blood, and want of tone, and resistance to the knife, in the muscles and other tissues, have been since abandoned, it would be a waste of time to allude to them.

1. *Danger and inconvenience in their administration.* Ether and chloroform are undoubtedly agents of vast power ; and, as experiments on animals plainly show, if taken in a sufficient quantity they produce death. The effects of their inhalation when carried, as I have sometimes witnessed without any inconvenient result, to such an extent that all consciousness and sensibility are destroyed, the pulse scarcely to be felt, the pupils dilated,

* Of the last twenty-nine cases of amputation of the breast which I have performed or witnessed, only two terminated fatally.

the muscles relaxed, the limbs motionless, the breathing laboured, and almost stertorous, with puffing of the flaccid cheeks, and the countenance having the appearance of a person struck with apoplexy, would excite alarm in any one who witnessed them for the first time. Yet it is an astonishing fact that, although these powerful agents have been given during the past twelvemonth to an immense number of people, even for curiosity and pleasurable excitement, as well as for the most trifling and most important operations; often by persons totally inexperienced in their administration, and with defective and objectionable inhalers, the preparations themselves, too, being frequently impure; we can say of them, what cannot be asserted of any agent of equal power, that there is no authentic account of more than a single instance in this country, in which death has been caused simply by their poisonous operation. The fatal case alluded to is one of recent occurrence, near Newcastle-upon-Tyne, which has naturally produced a strong impression on the public mind, adverse for the moment to the reception of these remedies; but which, I have no hesitation in saying, has not shaken my confidence in them in the slightest degree. It appears that a girl, about fifteen years of age, inhaled chloroform previously to undergoing a painful but otherwise unimportant operation, and expired from its effects in about three minutes. Sir JOHN FIFE, a surgeon of eminence, who has acquired considerable experience in the use of chloroform in operations, and who examined the body, in his evidence at the inquest expressed the opinion that the unfortunate result was owing to some peculiarity in the girl's constitution.*

* Dr. Simpson attributes the death in this case to asphyxia, from the means used to restore the girl from the state of anæsthesia. (*Lancet*, Feb. 12, 1848.)—

There are accounts of some two or three other cases in which so deep a collapse has been produced by these agents, more especially by chloroform, that life has apparently been endangered, and restoratives have been resorted to in order to revive the sinking powers. That alarming effects of this kind should occasionally arise, or that a death should occur on the introduction of these remedies, from an over-dose, or in persons peculiarly susceptible to their influence, is no more than might reasonably be expected, considering their great power. But no further importance can be attached to these accidents, than as inculcating greater care and caution in the use of these agents, and as discouraging their indiscriminate employment in trifling cases, and in operations attended with only slight and momentary pain. Powerful, therefore, as are these remedies, all who are experienced in their use agree that they are, on the whole, safe and manageable; and their safety peculiarly depends on the transitory and evanescent nature of their influence; for, from the moment they cease to be inhaled, they begin to pass off rapidly from the system in expiration, and their influence declines; so that whatever risk may be incurred by their rash, careless, and unnecessary use, scarcely any apprehension need be entertained from their skilful and cautious administration. As in using other active remedies, no one should give ether or chloroform vapour without having carefully studied their effects on the human body. In operations, especially the more important, the surgeon should be relieved from all care and

He very properly cautions the profession against giving strong drinks to persons profoundly affected by chloroform, recommending the sprinkling of cold water to the face, and the excitement of respiratory acts, as the means best calculated to revive the patient. Both in man and animals, I have been struck with the rapidity of recovery from blowing on the face and the application of cold.

responsibility connected with the inhalation, and his mind left free to be directed solely to the steps of the operation. In these cases the administration of anæsthetic agents should, if possible, be intrusted to a person, who by practice, has acquired a nice perception of their action, and a full knowledge of their powers and varying effects, so as to be able to produce and maintain their influence in a proper degree, until the operator has ceased to use the knife, or to subject his patient to pain.

There are certain states in which the full effects of anæsthetic agents cannot be produced without danger; as in organic diseases of the heart, especially a dilated or weak heart; and in tendencies to congestion of the brain in plethoric individuals. We are not often called upon to operate under such circumstances, and it will be the duty of the surgeon to discriminate accordingly. But these cases constitute no objection to their being given to the majority of persons about to undergo operations. We might as reasonably exclude some of our most valuable remedies, such as morphia, digitalis, and prussic acid, from the *Materia Medica*, as object to the use of anæsthetic agents, because there are particular conditions of disease, and of the system in which they operate injuriously; or because an excessive dose is calculated to cause death.

There is another point which it is important for the surgeon to bear in mind, when operating on patients powerfully affected by chloroform: and this is, the liability to secondary hemorrhage, if particular care be not taken to secure the principal vessels divided. The action of the heart is sometimes rendered so feeble by this agent, that it often happens that vessels of considerable size, when cut, pour out scarcely any blood, and consequently easily escape observation; but after the patient has been

sent to bed, and the influence of the chloroform has passed off, free bleeding is liable to ensue. By attention to the sources of bleeding during the operation, and taking care to have the patient properly watched for a short time afterwards, in cases where any risk of hemorrhage appears to exist, all danger from this cause may be readily avoided.

The chief inconveniences arising from the use of anæsthetic agents, are vomiting, and excitement, attended with more or less violent action of the muscles. The former may be avoided by directing that no meat be given for a few hours before the operation. The excitement prevents the operator from proceeding, but it is only occasionally manifested as the agent first begins to act on the system, and it may generally be subdued by persisting in the inhalation. I have repeatedly witnessed powerful muscular action stilled in a few seconds, by gently restraining the patient and persevering in the use of the remedy.

2. *Hurtful effects on the constitution increasing the fatality of operations.*—A feeling of distrust in regard to the use of anæsthetic agents has arisen, not so much from fear of any immediate risk to life, as from a vague apprehension of their increasing the fatality of operations. That this fear is wholly groundless, is satisfactorily established by the very favorable results of the operations performed during the past year. In Dr. SNOW's Report of the Operations at St. George's and University College Hospitals in which he administered ether, the deaths were remarkably few; five only of 26 cases of the great amputations having ended fatally. Of 14 amputations of the thigh but two died.* Of 10 amputations of the thigh, per-

* Dr. Snow, on the Inhalation of the Vapour of Ether, p. 78.

formed on patients under the influence either of ether or chloroform, at the London Hospital, only one died. In an unpublished table of cases of the larger amputations performed during the past year upon patients under etherization, for which I am indebted to the kindness of Dr. SIMPSON, of Edinburgh, it appears that at eight of the London hospitals there were 73 cases of amputation of the thigh and leg, of which number 14 proved fatal, giving a mortality of about 19 per cent. On referring to a table of amputations in the hospitals of London, performed from 1837 to 1843, collected with care by a private Society to which I have the honour of belonging,* I find 134 cases of amputation of the thigh and leg, of which 55 were fatal, giving a mortality of 41 per cent., or more than double that which occurred in the operations upon persons in a state of etherization. Dr. SIMPSON'S table contains 324 cases of amputation of the thigh, leg, arm, and fore-arm, of which 72 died, or 22 per cent. In the table of the Society, there are 186 cases of the same operations, and 69 deaths, or 37 per cent. But, without wearying you with statistical details, I trust I have stated enough to show the remarkable success, which has hitherto attended the amputations performed at some of the principal London hospitals, on patients in a state of anæsthesia, and it can scarcely be doubted that the prevention of pain formed an important element in contributing to the favorable results. I know well the fallacy to which statistical records of this kind are liable, and the distrust with which they are received, but after all, the ultimate success of painless operations is the test, —the only safe and sure test, by which the benefit and

* The Medical Society of Observation.

value of anæsthetic remedies can be determined; and it has been plainly shown that, so far as our present experience extends, the results amply sustain the views of those who have been most sanguine in their expectations of a diminished mortality from the use of these agents.

Shortly after ether was first introduced, there were reports of cases in which the vapour was supposed to have acted injuriously, and to have conduced to the patient's death. Other instances of hurtful consequences from anæsthetic remedies have since been adduced. But with the strong evidence of their beneficial effects which we now possess, and with the growing confidence in their favour of the surgeons, not only of this country, but of France and Germany, I am not disposed to attach much weight to any of the cases I have yet heard of, in which unpleasant results have been reported. As with opium and other valuable remedies, in some peculiar constitutions, and in patients labouring under certain organic diseases, anæsthetic agents may not act kindly, and we may now and then meet with a case in which an operation would have succeeded better without them; but these are exceptions, and really constitute no objection to the use of these remedies in the majority of cases occurring in practice.

There is a condition in which the surgeon would naturally be extremely cautious in giving anæsthetic remedies, until experience had fully proved that they might be safely employed. I allude to that state of depression or shock consequent upon a severe injury to a limb requiring amputation. Since these agents have been in common use at the London Hospital, I cannot say that I have met with any case in which the powers have been so depressed by an injury, as to excite any apprehension

of danger from their use. A few years ago, a man was admitted from the Eastern Counties Railway, having sustained a compound fracture of the leg, and a deep and extensive laceration of the muscles reaching to the lower part of the thigh. He was in a profound state of prostration, which continued notwithstanding the administration of stimulants, and he died in about eighteen hours, without the powers having rallied sufficiently to admit of amputation of the injured limb. Such appears to have been the fate of the distinguished minister, Mr. HUSKISSON, who received a very similar injury at the opening of the Manchester and Liverpool Railway. Now, this is a condition in which a judicious surgeon would probably not venture to give chloroform. Nor would it be needed. For not only, as Mr. TRAVERS has remarked, does "the shock suspend the sensibility of the system,"* but the state is one in which an operation cannot be safely undertaken. Besides, these are rare cases. Patients who are brought to hospitals after severe injuries have generally somewhat recovered from the first effects of the shock, and though the heart acts feebly, there is sufficient power to admit, if necessary, of operative proceedings. In this state anæsthetic remedies usually exert a beneficial influence. They not only act as stimulants and raise the pulse, but they save the patient the hurtful effects of a second shock ; and, in general, if too powerful an influence be not produced, or if the action of the agents used be not too long continued (which should of course be avoided), and unless much blood be lost in the operation, a healthy state of reaction is found to be established within an hour afterwards, and the patient is

* Lib. cit., p. 56.

in a more favorable state for recovery than he would have been, had not the remedy been employed. It has been found, too, that in persons reduced by tedious illness and exhausting discharges, where an operation is required to save life, anæsthetic remedies, instead of increasing debility, have helped to support the patient during the operation, and had an exhilarating effect on the powers of life afterwards ; so much so, that these cases really seem peculiarly adapted to exhibit their beneficial action. In having recourse to them, however, in these states of depression, it must be borne in mind that their effects are readily and quickly developed, and caution must be observed, so as not to produce too powerful an effect.

I fear that I have already drawn too largely on your attention ; but I must be permitted briefly to allude to the use of anæsthetic remedies in some other surgical cases. They have been found of valuable service in preventing or allaying the severe lingering pain experienced after the application of the chloride of zinc, and nitric acid to cancerous sores, sloughing ulcers, and hospital gangrene. In dislocations, they have proved very important aids, not merely in saving the patient the distressful sensations usually caused by violent extension, but in overcoming the muscular resistance, and thus rendering a less amount of force necessary in order to replace the bone. This has been manifested in the ready reduction of many recent dislocations, and in the setting right of old dislocations of the shoulder, even of ten weeks and three months standing. I anticipate great benefit from the use of these remedies, in subduing the painful spasms to which the muscles of a fractured limb are sometimes liable, preventing the adjustment of the bones ; in relieving pain and spasm, and facilitating the

taxis, in acute cases of strangulated hernia in young and muscular subjects ; and in relaxing the parts, and allowing the escape of urine in cases of retention from spasmodic stricture. In some of these cases we have already had reports of their favourable effects. Though anæsthetic agents have not been of much service when used in the worst forms of tetanus, they are still deserving of further trial in such a manner as to ensure a protracted influence upon the system ; and if, as I fear, they prove unequal to subdue permanently the dangerous paroxysms in the acuter cases, they may yet help to ease the patient's sufferings, and in milder cases assist effectually in mitigating the disease.

Anæsthetic agents, then, must be prized not only for their perfect power of annulling pain in all its varieties and degrees of intensity, but still more for their remedial influence in relaxing muscles, lessening constitutional disturbance, and diminishing the mortality of operations. The discovery of the powers of ether vapour was the original and most important improvement, and the one which led to our present knowledge of the utility and advantages of these remedies for pain. But I should be wanting in justice to our countryman Dr. SIMPSON, if I did not acknowledge the valuable services which he has rendered to our art, by ascertaining the virtues of Chloroform ; and the great zeal and energy with which he has advocated the cause, and demonstrated the value of these new means for alleviating human suffering, especially as applied to that interesting department of practice, obstetric surgery. Gentlemen, posterity will assuredly reward with grateful praise and honourable mention, the labours of those by whose ingenuity, enterprise, and exertions, so great a blessing has been realized and

made known to us. And, let me add, that there is no surgeon who loves and honours his profession, for the opportunity which it gives him of relieving the misery of our common nature, who will not rejoice at his office being for ever stripped of even the semblance of inhumanity, and a callous indifference to woe.

To those, who esteem medicine for its true ends, but who know practically its imperfections and deficiencies, there is something very hopeful and cheering in every real advance in professional knowledge, and in the discovery of any new power for conquering disease. Not only do we recognise a present means of lessening our failures and disappointments, but we look on each accession, as in itself suggestive,—as bearing the germs of further progress and greater triumphs. Now, it is in this light,—as containing the elements of fresh successes, and as stimulating the energies of all inquiring minds, that in closing this address, I would ask you to regard the discovery that I have this day dwelt upon. We know not yet the full value and extent of our gain ; and we may cherish the hope, that by pursuing science, in the enlightened spirit of that great man whose name our Society has proudly adopted, greater achievements are still in store ;—that pain and disease will yield still further to our efforts ; and that man, notwithstanding the inevitable doom, may be preserved longer, freer from misery and care, fresher and healthier in mind and body, better fitted to fulfil his mission here,—to serve the purposes of the Creator, to acknowledge His wisdom and power, and to enjoy and extol His beautiful and wondrous works.

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